

NEWS REPORT

NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL



Volume X, Number 6

NOVEMBER-DECEMBER 1960

JAN 31 1961

CONTENTS

FEATURE ARTICLE

The Challenge of Transportation . . . <i>John S. Coleman</i>	81
SCIENCE NEWS	84
RECORD OF MEETINGS	93
NEW PUBLICATIONS	95

EDITORIAL BOARD

FRANK L. CAMPBELL	GLEN FINCH
R. KEITH CANNAN	LOUIS JORDAN
JOHN S. COLEMAN	M. H. TRYTTEN

Editor: WALLACE W. ATWOOD, JR.

Editorial Office: 2101 Constitution Ave., Washington 25, D. C.

NEWS REPORT is published bimonthly by the National Academy of Sciences-National Research Council. It is designed to report current activities of divisions, boards, committees, and other established groups within the organization, and to record news of cooperating Societies and developments in the field of international science. It is distributed without charge to organizations and individuals directly associated with the Academy-Research Council; it is available to others at the rate of \$2.00 per year.

NEWS REPORT

National Academy of Sciences National Research Council

VOLUME X

November-December 1960

NUMBER 6

The Challenge of Transportation

JOHN S. COLEMAN, *Executive Secretary*

Division of Physical Sciences

A RECENT Academy-Research Council publication "Conference on Transportation Research" (NAS-NRC Pub. 840) reports the results of the month-long transportation study conducted last August at the National Academy of Sciences' Study Center in Woods Hole, Mass. Under the leadership of Professor Harmer Davis of the University of California at Richmond, almost two hundred participants from industry, universities, and government were convened to examine problems confronting various aspects of United States transportation and to provide guidance to the Academy-Research Council in determining the directions in which science and technology might contribute more effectively to their solution.

As viewed by the study group, transportation is the total of the vehicles, terminals, investments, personnel, industry, and supporting facilities and policies required to achieve the timely and efficient movements of people, goods, and materials within and across the borders of this nation. A complete inventory of the elements and resources of U. S. transportation does not now exist. Yet today it is estimated that this total represents an expenditure ap-

proaching \$100 billion per year. Over the next decade, the outlay will probably exceed a trillion dollars. Further, the impact of this vital function on other areas of the nation's economy and patterns of living will strongly influence, if not control, decisions over greater sums—equivalent, perhaps, to half of the gross national product.

The complexity of the entire transport system and its resources are staggering. To the national rail, air, marine, and highway networks must be added the resources provided for the urban movement of pedestrian, automobile, truck, and public transit traffic. To the recorded totals of ton-miles and passenger-miles compiled by regulated public carriers must be appended the even larger and still increasing totals estimated for private carriers—the business aircraft, the company-owned truck, produce carriers, and especially the private automobile. With industries, the vast supplier must be counted the material and human resources represented by the service industries required to maintain and regulate the vehicles, highways, air routes, and terminals which together comprise the enormous complex which we describe simply as transportation.

The development of transportation and its supporting facilities in this nation has been closely bound up with the development of technology. In particular, the invention and evolution of reliable and efficient sources of power have made possible in time-succession the steamboat, railways, the truck and automobile, and aircraft. Closely interrelated with this growth has been the development of the communications industry, telegraph, telephone, radio, and radar which have made possible operating systems capable of meeting the needs of a growing nation. Close relationships exist, too, between the growth of American industry, with its emphasis on mass production in centralized plants, and an elaborate transportation network capable of bringing the materials and delivering the manufacturer's product to its widely dispersed customers.

In the past, transportation has thus played a leading role in making possible the development of the nation's industrial economy and the provision of a standard of living unmatched throughout the world. In providing this function, United States transportation has itself grown to the stage where it can offer a coverage and variety of choice afforded no other nation. In turn, this nation has become critically dependent upon transportation in every aspect of its social, political, economic, industrial, and military operations. Today, however, transportation appears to be losing its past role of leadership, of creating opportunities for further growth, and may, in important aspects, become incapable of meeting the challenges of a rapidly moving civilization.

Nor are these problems unique to the United States. Technical obsolescence, changing economic and social patterns, overlapping facilities, and the other challenges which face American transportation industries have their greater or lesser counterparts in other industrialized nations of the world. In many of these countries a solution has been sought in state control and state operation under general tax subsidy. If private transport is to survive in the United States, many observers believe that a vigorous and comprehensive program to improve efficiency and responsiveness to

present and future transportation demands must be initiated without delay.

If projections of United States population and economic growth are realized, the responsibilities of the transport system are going to be enormously increased. Over the next two decades, demands for freight transport may rise by as much as a trillion ton-miles over present levels. There may be 125 million people living in and around metropolitan areas—as much as the entire population of the United States only two decades ago. This growth may not be possible to achieve without the effective development and operation of the country's transport resources. Efficient production and distribution, effective use of resources, success in community planning and urban redevelopment—these and all of the measures contributing to higher rates of economic and social development will depend on how well the transportation industries are able to perform.

Only part of the problems facing the transportation industries are technological in nature. Even if there were full agreement among the many groups concerned with specifications for future service and demands, serious and pressing questions of public policy and regulation, financing, labor displacement, and systems compatibility remain. Technology is not limiting development, but is proceeding at a greater rate than the carriers are able to utilize it. Most of the needed technology exists and could be readily adapted to specified needs. But the cost of these new techniques, and of further supporting research, probably will substantially exceed current budgets. Advances in many areas of research—in materials and energy sources, for example—will have a continuous impact on transportation needs and demands. However, there is far too little ability to specify desired change or how these advances can best be utilized.

A characteristic of transportation is its diffuse nature, the separate and distinct treatment of its component parts, the scattered and divided responsibilities for its design, operation, and control. It was re-

ported during the course of the study that to secure approval for an element of a transportation plan in the greater Philadelphia area, concurrence from over 200 Federal, State, and local authorities had to be secured. Regulation and rate-making are divided among an even greater number of national and local agencies. Data and statistics are available by the ton, compiled by thirty or more agencies of the Federal Government alone. Even greater quantities may be had from industry, associations, and pressure groups. Literally, one can find answers to almost any question, given time and patience. But the answers obtained vary with the source. Data are not compatible and are only rarely addressed to questions of importance for comprehensive planning in industry or government. Reliable, comprehensive statistics on the movement of people and goods by modes, showing time trends, cause and effect relationships, and by length, nature, and elapsed time of trip are not available. Accounting procedures by which true costs can be determined with some accuracy are rare. The lack of such information undermines the basis for intelligent, informed decisions, both in industry and government.

The diminishing challenge of transportation has had its effect in sharply reducing the skilled manpower available to the industry. Enrollments and courses in this field have fallen off in universities during the past few decades in favor of more promising career areas. So, too, has research—not only in the universities but also in much of industry and government.

Yet, as the demands grow so also will the necessity for understanding transportation as the functioning of a flexible multi-mode system, in which the performance of each element can be described and measured in relationship to contiguous elements, and thus to the whole.

This capability to analyze, measure, and project the performance of present and postulated transportation systems has not yet been developed. But perhaps the most important agreement reached among those from industry, government, and universi-

ties, who participated in the present study, is that not only can it be achieved, but that this capability is essential to the constructive solution of the entire range of related questions and decisions.

In succeeding chapters of the group's report, detailed consideration is given to sociological, political, technological, statistical, and manpower aspects of present and future capabilities. In each of these, as in the chapter dealing with the techniques of analysis, will be found examples of need for clearer insight and guidance toward constructive reforms. The most urgent of these needs may well be those of the regulatory bodies whose individual decisions and broad policies should nurture a healthy, dynamic system, responsive to changing conditions and emerging technology.

An analytical program of this magnitude cannot be carried out without the full support and active participation of both government and industry, representing all major modes of transport and all major government functions. It must draw upon the cooperative efforts of many disciplines—the physical scientist, engineer, economist, urban planner, sociologist, geographer, and mathematician. It must be supported also by adequate and accurate data now residing in many separate agencies. It must utilize the powerful modern tools and techniques which have been developed by the defense and communications industries, and it must, by its vigor and challenge, attract those from many fields whose wisdom, skills, and enthusiasm will be critical to the program's success.

In reporting the study group's findings to the Governing Board of the Academy-Research Council, Professor Davis emphasized the need for a continuing body to give attention to the task of detailing a comprehensive and practicable program which could command responsible attention and support. This approach has been endorsed by the Governing Board which authorized the President of the Academy to appoint an ad hoc committee for this purpose.

SCIENCE NEWS

AUTUMN MEETING NATIONAL ACADEMY OF SCIENCES

The 1960 autumn meeting of the National Academy of Sciences was held November 14-16 at the University of Pennsylvania, Philadelphia, Pa. Sixty-two contributed papers were presented at the seven technical sessions; in addition, eleven invited papers were presented at the three symposia held on Tuesday, November 15. All the scientific sessions, as is customary, were open to the public. There was a business session for members only on Tuesday morning.

Roy F. Nichols, Vice Provost of the University of Pennsylvania and a well-known historian, delivered the public lecture on Monday evening on "The Magic Square," referring to the Philadelphia birthplace of a great part of American science.

The President of the University of Pennsylvania, Gaylord P. Harnwell, served as chairman of the symposium on "Some Current Concepts in Solid State Science," held on Tuesday morning. The three speakers, all from the University of Pennsylvania, were H. B. Callen, Department of Physics; R. Maddin, School of Metallurgical Engineering; and R. E. Hughes, Department of Chemistry.

Two simultaneous symposia were held on Tuesday afternoon: "Energy-Linked Biological Reactions," with David R. Goddard, Director of the Division of Biology, University of Pennsylvania, as chairman; and "Crowding, Stress, and Natural Selection," with Carleton S. Coon, Curator of Ethnology and Professor of Anthropology, University Museum, and Academy member, as chairman. The invited participants at the first symposium were:

A. SZENT-GYORGYI, Marine Biological Laboratory, Woods Hole, Mass.

W. ARNOLD, Oak Ridge National Laboratory
PHILIP GEORGE and R. J. RUTMAN, University of Pennsylvania

MILDRED COHN, University of Pennsylvania

BRITTON CHANCE, University of Pennsylvania

Invited papers at the second symposium were presented by John J. Christian, University of Pennsylvania and Penrose Laboratory, Zoological Society of Philadelphia; Robert Snyder, Penrose Laboratory, Zoological Society of Philadelphia; and Anthony F. C. Wallace, Eastern Pennsylvania Psychiatric Institute.

Members of the Academy and their guests, as well as the participants in the various scientific sessions were entertained at several social events during the three-day meeting. On Monday evening, November 14, they were guests of the American Philosophical Society at the Hall of the Society, where they were greeted by President and Mrs. Henry Allen Moe and served a buffet supper. On Tuesday evening, the Provost and Trustees of the University entertained them at dinner in the University Museum. Preceding the dinner, President and Mrs. Bronk of the Academy and Provost and Mrs. Eiseley of the University received members and guests.

INDIAN SCIENCE CONGRESS AND SILVER JUBILEE

The Indian National Institute of Sciences will be celebrating its Silver Jubilee December 29-January 2. The Indian Science Congress will be held January 3-9, 1961 under the auspices of the Indian Science Congress Association.

Ralph W. Gerard, member of the National Academy of Sciences, will represent the Academy at both the Silver Jubilee Celebration in New Delhi and the Indian Science Congress in Roorkee, India. Dr. Gerard is chairman of the United States Committee of the International Union of Physiological Sciences and, at present, is Director of Laboratories at the Mental Health Research Institute, University of Michigan.

Dr. Gerard will carry greetings from the President of the National Academy of Sciences to the Congress and Silver Jubilee.

SCHOOL FIRE REPORT READY

The report entitled "School Fires: An Approach to Life Safety" (NAS-NRC Pub. 832) is now available. Carried out under the auspices of the Building Research Advisory Board (BRAB)—operating unit of the National Academy of Sciences' Division of Engineering and Industrial Research—in concert with the Committee on Fire Research, and supported by a grant from the Educational Facilities Laboratories, Inc., it represents a compilation of data and informed opinions on a subject made vivid for the American public by the 1958 disaster at Our Lady of the Angels School in Chicago.

The special committee appointed to direct preparation of the report drew upon the guidance of leaders in education, architecture and engineering, and fire safety, together with building codes officials and others having a special concern with major aspects of the problem. Through an extended process of gathering, screening, and reconciling material from diverse sources, seeking authoritative criticism and subjecting the whole to constant review, the committee believes it has brought together an accurate statement of the current state of knowledge and need regarding buildings, equipment, and personnel, together with a sound approach, to ensuring life safety in schools.

The report, illustrated with drawings and photographs, may be obtained at a single-copy price of \$2.50 (with special prices on multiple-copy orders) from the Printing and Publishing Office of the Academy-Research Council.

VISITING FOREIGN MATHEMATICIANS

The Division of Mathematics has announced the appearance of its annual list of Visiting Foreign Mathematicians. The list includes information about mathematicians and statisticians who are spending some part of this academic year in the United States and gives the home country of each, the dates of their visit, and the name of the host institution. Copies are available upon request from the Division of Mathematics, Academy-Research Council.

DISASTER RESEARCH GROUP

The continuation of the work of the Disaster Research Group has been approved by action of the Governing Board of the Academy-Research Council. The Disaster Research Group, in continuing their work, will be guided by an advisory committee. The committee will be designed primarily to advise the Office of Civil and Defense Mobilization (OCDM) on behavioral problems and will focus specifically on the OCDM behavioral research program. It will also conduct symposia on civil defense behavioral topics.

The operation of the Advisory Committee will be the responsibility of the Executive Council which was appointed on the 9th of November by Detlev W. Bronk, President of the National Academy of Sciences. The first meeting of the Executive Council was held in the office of the Disaster Research Group, November 28.

Those members appointed to the Executive Council were:

John Gillin, University of Pittsburgh, *Chairman*
Leonard S. Cottrell, Jr., Russel Sage Foundation
Gerald R. Gallagher, Office of Civil and Defense Mobilization
Resis Likert, University of Michigan
Ralph E. Spear, Office of Civil and Defense Mobilization
George Baker, National Academy of Sciences—National Research Council, *Ex Officio*
Glen Finch, National Academy of Sciences—National Research Council, *Ex Officio*
Ralph L. Garrett, Office of Civil and Defense Mobilization, *Ex Officio*

SCIENTIFIC ATTACHES VISIT THE ACADEMY-RESEARCH COUNCIL

The annual luncheon in honor of the scientific members of the diplomatic corps stationed in Washington was held in the Great Hall of the Academy on November 17. Among the eighty persons attending this luncheon, held under the auspices of the Office of International Relations, were 34 science representatives from 26 countries. Howard P. Robertson, Foreign Secretary of the National Academy of Sciences, welcomed the group on behalf of the Academy.

In addition to the opportunity of meeting once again with the Academy staff and professional colleagues of the several U. S. Government departments and agencies, the guests had the special pleasure of meeting informally with Walter G. Whitman, the newly appointed Science Advisor to the Secretary of State.

The following countries were represented at the luncheon:

Argentina	Norway
Australia	Pakistan
Austria	The Philippines
Belgium	Poland
Canada	Portugal
Denmark	Sweden
Germany	Switzerland
Great Britain	Turkey
India	Union of South Africa
Ireland	Union of Soviet Socialist
Italy	Republics
Japan	United Arab Republic
Mexico	Yugoslavia
The Netherlands	

HIGHWAY RESEARCH BOARD

More than 2500 engineers, scientists, and scientific officers concerned with highway transportation will attend the 40th annual meeting of the Highway Research Board, January 9-13, in Washington, D.C. The theme selected for the meeting is, "Highway Progress Through Research." Augustus Kinzel, Chairman of the Division of Engineering and Industrial Research, will welcome the group. L. R. Hafstad, Vice President In Charge of Research for General Motors, will discuss the future of highway transportation, and Detlev W. Bronk, President of the National Academy of Sciences, will speak on "Horizons of Science." Pyke Johnson, Chairman of the Highway Research Board, has chosen as his topic, "As We Go Forward."

During the technical sessions of the 5-day meeting, 48 papers will be delivered and more than 200 additional reports have been scheduled. The material to be presented will cover these subjects: Economics, Finance, Materials, Maintenance, Construction, Traffic, Operation, Soils, Geology, Night Visibility, Air Equipment, Electronic Research, and Urban Research.

All technical sessions will be open to the press and interested members of the public.

PLANET EARTH FILM SERIES

The National Academy of Sciences announces the completion of its "Planet Earth" film series. Produced under a grant from the Ford Foundation, it embraces thirteen 16-millimeter, 27-minute educational films, available in both color and black-and-white, covering the principal fields of geophysical research which have been stressed in connection with the International Geophysical Year (IGY).

The film series, the first produced by the Academy, originated in the interest of students, teachers, and the general public in the IGY. The films synthesize man's knowledge of his physical environment, and also delineate newly developed and power tools for gathering data on space and the cosmos, such as rockets and satellites. Extensive film footage was shot for the series in all parts of the world both during and after the IGY, thus providing the viewer with the stimulus and interest of field work at home and in distant places. Hugh Odishaw acted as Director of the series, and Lothar Wolff of Louis de Rochemont Associates, Inc., served as producer. The series was produced by the Academy in cooperation with the WGBH Educational Foundation of Cambridge, Mass.

To assist over two hundred geophysicists who cooperated in the production of the films, an Advisory Committee on Education (IGY) was established by the President of the Academy. The committee included the following members:

WALLACE W. ATWOOD, JR., Director, Office of International Relations, Academy-Research Council

JAMES S. COLES, President, Bowdoin College

CAREY CRONEIS, Provost, Rice Institute

LAURENCE M. GOULD, President, Carleton College

J. WALLACE JOYCE, Head, Office for Special International Programs, National Science Foundation

JOSEPH KAPLAN, Chairman, U. S. National Committee for the IGY

JOHN R. MAYOR, Director of Education, American Association for the Advancement of Science

HUGH ODISHAW, Executive Director, U. S. National Committee for the IGY

ALAN H. SHAPLEY, Vice Chairman, U. S. National Committee for the IGY

RANDALL H. WHALEY, Executive Secretary, Advisory Board on Education, Academy-Research Council

The Academy has concluded an agreement with the McGraw-Hill Book Company, Inc., to provide for the sale and distribution of the film series both in black and white and in color.

JOINT MEETING OF RADIO SCIENTISTS AND RADIO ENGINEERS

The U. S. National Committee of the International Scientific Radio Union (URSI) and the Institute of Radio Engineers' Professional Groups on Antennas and Propagation, Circuit Theory, Instrumentation, Information Theory, and Microwave Theory and Techniques, will hold a joint meeting at the Boulder Laboratories of the National Bureau of Standards, December 12-14.

The technical sessions of the program will include the presentation of 93 papers related to the research done by four U. S. Commissions of URSI, permanent bodies for centralizing studies in the principal technical fields. Frederick W. Brown, Director of the Boulder Laboratories, will welcome the guests before the opening session on December 12. The first session, a combined meeting of all Commissions, will be devoted to a review of the scientific highlights of the Thirteenth General Assembly of URSI, held in London, this past September. All seven International Commissions will be represented.

Problems of the space age will be a feature of one of the afternoon sessions on December 12 under the chairmanship of Paul M. Green, Jr., of the Lincoln Laboratory, Massachusetts Institute of Technology. That same evening a panel, led by R. M. Fano of the Research Laboratory of Electronics, Massachusetts Institute of Technology, will discuss "Information and Circuit-theory Problems in Space Probing and Communication."

The main speaker at the banquet on Tuesday evening, December 13, will be J. Howard Dellinger, Honorary President of URSI, who has selected as his topic "Almost 50 Years of URSI."

Another expected highlight of the meeting is the special session on "Solar Proton Events," scheduled for the morning of December 14, under the chairmanship of D. K. Bailey, National Bureau of Standards.

INDIAN OCEAN EXPEDITION

The Indian Ocean Expedition sponsored by the Special Committee on Oceanic Research (SCOR) of the International Council of Scientific Unions (ICSU), was agreed upon in the fall of 1959 and grows out of the concept of the IGY. It focuses, however, on one broad area of the globe (14 percent of its surface) and one group of disciplines related particularly to earth surface phenomena.

As the United States adhering body to ICSU, the Academy-Research Council, through its Committee on Oceanography, assumes the responsibility for the design of a national program for SCOR's expedition. Under the aegis of the Academy's Committee on Oceanography five working groups of American scientists are developing a program for our national effort, which, in the early months of 1961, will be related to other nations' plans in disciplinary investigation of the significant problems of the bottom, the sea, and the atmosphere of the Indian Ocean. With the financial support of the National Science Foundation the Academy provides the necessary full-time international coordinator of the expedition through the establishment of a coordinator's office for SCOR for the life of the expedition (1960 through 1964).

To round out and integrate the disciplinary coverage of the air-sea geophysical phenomena, the Committee on Atmospheric Sciences has now joined in the design of a national effort which will include marine geology, geophysics and bathymetry, marine biology, physical and chemical oceanography, meteorology, and the basic problem of expeditious data handling and analysis.

The expedition, already described in various publications, such as the *IGY Bulletin* for August 1960, will have vessels from over a dozen nations, scientists from almost as many more, and between fifteen to thirty vessels on numerous cruises conducting investigations over most of the Indian Ocean. An international Working Group for SCOR has drawn up and agreed upon an over-all scientific program. Australia, British East Africa Territories,

France, German Federal Republic, India, Indonesia, Japan, Pakistan, Union of South Africa, Union of Soviet Socialist Republics, and the United States, together with other possible participants—Canada, Ceylon, Denmark, Israel, Netherlands, Portugal, and Taiwan—are in the process of developing national programs related to the overall international design.

UNIVERSITY PATENT POLICIES AND PRACTICES

With the aid of grants from the Department of Defense and the National Institutes of Health, the Office of Patent Policy Survey is making a factual survey and interpretive analysis of current policies, practices and procedures of universities, colleges, institutes of technology, and independent professional schools with respect to the conduct of scientific research and the handling of discoveries and inventions resulting from such research.

Nearly ten years have elapsed since the last survey, the findings of which were published in the monograph "University Patent Policies and Practices," and a number of significant changes have occurred in the interim. New policies and practices have been adopted, existing ones have been revised, and procedures have been modified to meet changing conditions and the impact of increased outside support for university research, especially from the Federal Government.

The current survey is concerned particularly with the procedure for handling research grants and contracts, the arrangements and agreements made with faculty members and research workers, the method of reporting new discoveries and inventions, and patent management practices.

The report on the findings of the survey will cover the historical background and trends, special features of policies, considerations in the formulation of a policy, administrative procedures, special research institutes, patent development agencies, disposition of patent property, licensing experiences and recognition of the equities of inventions.

SEMINAR ON MECHANISM OF FORMATION OF ORGANIC MATRIX

The Committee on the Skeletal System with the support of the National Institutes of Health presented a seminar on "Mechanism of Formation of Organic Matrix with Particular Reference to the Skeletal System," October 6-8, at the Medical Society of the District of Columbia. Alfred R. Shands, Jr., Chairman of the Committee, acted as general chairman of the symposium.

The program was organized in the form of four half-day seminars that were presented by panels of outstanding investigators. The panel subjects and the presiding chairmen were as follows:

Panel I: Structure and Composition of Connective Tissue Matrix, Robert A. Robinson, The Johns Hopkins University Hospital

Panel II: Matrix Formation, Albert Dorfman, University of Chicago

Panel III: Tissue Interactions and Induction, Paul A. Weiss, The Rockefeller Institute

Panel IV: Resorption of Bone Matrix, John E. Howard, The Johns Hopkins University Hospital

The assembly of 218 individuals included members of the Orthopedic Research Society; heads of department of orthopedic surgery of medical schools; individual investigators; and certain residents, fellows, and medical students who, by reason of their research interests, were nominated for attendance by the heads of departments.

The seminar subject was well suited to the furtherance of the Committee's objectives, which include the promotion of basic research related to the broad field of orthopedic surgery and the stimulation of young orthopedic surgeons to engage in investigative activities relevant to the musculo-skeletal system. The results of this conference have encouraged the Committee to initiate plans for a second seminar in 1962.

NINETEENTH INTERNATIONAL GEOGRAPHICAL CONGRESS

The Tenth General Assembly and 19th Congress of the International Geographical Union were held at Stockholm, Sweden, August 6-13, with more than 1,700 geographers from 64 countries in attendance. The United States was represented by a 13-man

delegation appointed by the Academy-Research Council (*see* News Report, Vol. X, No. 4, p. 59), under the chairmanship of J. Warren Nystrom, U. S. Chamber of Commerce.

Over 400 geographers from the United States registered for the Congress and participated in the sectional and commission meetings, as well as in the symposia and excursions held before and after the Congress. These pre- and post-Congress programs and excursions were especially designed to portray the significant geographic features of each of the Norden countries. The excursions were led by competent geographers thoroughly familiar with the features and problems of the areas covered, thus adding greatly to the participants enjoyment.

The exhibits prepared for the Congress were divided into three categories: *a*) thematic maps, *b*) national atlases, and *c*) population maps. The United States exhibit of thematic maps had been carefully prepared and was well received. The display centered on the Salt Lake City area; and, in addition to the series of maps portraying the activities and features of the region, a machine for producing three-dimensional plastic relief maps was set in operation, so that each registrant at the Congress could receive a relief map of the Salt Lake City region as well as a descriptive booklet of the area. Other countries had excellent exhibits of national atlases and population maps.

The opening General Assembly of the Union was held on Saturday afternoon, August 6, and the closing session at noon on Saturday, August 13. At these two sessions the business of the Union was transacted. Among the major actions of the General Assembly were the following:

- 1) Elected the following officers to serve for the next 4-year period:

CARL TROLL (Germany), *President*
 HASSAN AWAD (Egypt), *Vice-President*
 CHAUNCY D. HARRIS (United States), *Vice-President*
 FUMIO TADA (Japan), *Vice-President*
 K. CUMBERLAND (New Zealand), *Vice-President*
 S. GUERASSIMOV (U.S.S.R.), *Vice-President*
 PIERRE MONBEIG (France), *Vice-President*

HANS BOESCH (Switzerland), *Secretary-Treasurer*

- 2) Accepted the invitation extended by the Royal Society to hold the Eleventh General Assembly and 20th Congress of the Union in Great Britain.
- 3) Voted to admit the following countries as regular members of the Union: Australia, Bulgaria, the German Democratic Republic, Guinea, Iran, Iraq, Malaya, Rumania, Union of South Africa, Republic of Korea, and Tunisia.
- 4) Voted to admit Hong Kong and Singapore as associate members of the Union.
- 5) Voted to drop Cuba and Colombia from membership in the Union for non-payment of dues.
- 6) Approved the continuation of the following 15 Commissions: *a*) Arid Zones, *b*) Applied Geomorphology, *c*) Bibliography of Ancient Maps, *d*) Coastal Sedimentation, *e*) Evolution of Slopes, *f*) Humid Tropics, *g*) Inventory of World Land Use, *h*) Karst Phenomena, *i*) Library Classification of Geographical Books and Maps, *j*) Medical Geography, *k*) National Atlases, *l*) Periglacial Morphology, *m*) Study and Correlation of Erosion Surfaces around the Atlantic, *n*) Teaching of Geography, and *o*) World Population Mapping.
- 7) Approved the establishment of two new Commissions: Cartography and Economic Regionalization.

The Organizing Committee of the Congress, composed of representatives from Denmark, Finland, Iceland, Norway, and Sweden, well merited the commendation given them for the excellent physical facilities provided, the fine planning, and the exceptional documentation on all the Norden countries presented to the registrants.

NINTH NATIONAL CLAYS CONFERENCE

The Ninth National Clays Conference, sponsored by the Committee on Clay Minerals was held at Purdue University, Lafayette, Ind., October 6-8. About 275 persons interested in research or technology in fields related to clays and clay minerals registered for the Conference.

In addition to the general sessions on clay mineralogy, emphasis was placed this year on two special symposia. The symposium on "Engineering Aspects of Physico-Chemical Properties of Clays" featured contributions on soil mechanics, and the symposium on "Clay-Organic Complexes" dealt with the basic studies of clay-organic systems in the paper and petroleum indus-

tries, in soil science, civil engineering, and related areas.

The Committee accepted an invitation from the University of Texas to hold the Tenth National Clays Conference in Austin, Tex. in October 1961.

SCIENCE AND FOOD: TODAY AND TOMORROW

A symposium, "Science and Food: Today and Tomorrow," arranged by the Food Protection Committee and designed as a public information device, was held in Washington, D. C., on December 8, 1960. Detlev W. Bronk, President of the National Academy of Sciences, served as chairman of the symposium and opened the discussions by setting the subject in the general perspective of advancing technology in all aspects of our society. William J. Darby, Chairman of the Food Protection Committee and Head of the Department of Biochemistry and Director of the Division of Nutrition, Vanderbilt University School of Medicine, described the general purposes and scope of the symposium. The eight other spokesmen discussed the contributions of science to provision and maintenance of the food supply from the viewpoints of agriculture, industry, nutrition and medicine, and public health and safety. Those who addressed the morning and afternoon sessions were:

- CHARLES S. DAVIDSON, Thorndike Memorial Laboratory, The Boston City Hospital
DAVID DAWSON, E. I. du Pont de Nemours & Company
J. G. HARRAR, The Rockefeller Foundation
C. G. KING, The Nutrition Foundation
GEORGE P. LARRICK, U. S. Food and Drug Administration
C. G. MORTIMER, General Foods Corporation
NEVIN S. SCRIMSHAW, Institute of Nutrition for Central America and Panama
R. BLACKWELL SMITH, JR., Medical College of Virginia

The symposium was attended by about 300 invited representatives of medical, public health, nutrition, and dietetic organizations; industrial associations; and by food editors and science writers, as well as members of the Food Protection Committee.

THE SOCIETY FOR VISITING SCIENTISTS

The Society for Visiting Scientists (S.V.S.), which came into existence during World War II, offers at its house, 5, Old Burlington Street, London, England, a center where foreign scientists visiting the United Kingdom may meet informally with other visitors and with British scientists. The aim of the S.V.S. is to encourage and provide for an active exchange of scientific thought and discussion between scientists of the United Kingdom and those from overseas. H.R.H. Prince Philip, Duke of Edinburgh, is Patron of the Society.

The Society's quarters provide a meeting place, a refectory, a library, and some residential accommodations. In addition, an information service is available to all members, and to visiting scientists. Through this service the S.V.S. is able to assist in many ways scientists on short visits to England, as well as students from overseas who are studying in England.

The Society's Council includes among its distinguished membership scientists from several countries, as well as many eminent British scientists. The President and Chairman of the Council is A. V. Hill, Emeritus Professor of Physiology in the University of London and Fellow of the Royal Society.

POSTDOCTORAL RESIDENT RESEARCH ASSOCIATESHIPS

The Academy-Research Council has announced that a program of postdoctoral resident research associateships, supported by several agencies of the Federal Government, will be offered for 1961-62 at the following laboratories:

- NATIONAL BUREAU OF STANDARDS, Boulder, Colo., and Washington, D. C.
NAVAL ORDNANCE LABORATORY, White Oak, Silver Spring, Md.
NAVAL RESEARCH LABORATORY, Washington, D. C.
NAVAL WEAPONS LABORATORY, Dahlgren, Va.
NAVY ELECTRONICS LABORATORY, San Diego, Calif.
U. S. ARMY CHEMICAL CORPS BIOLOGICAL LABORATORIES, Fort Detrick, Frederick, Md.

Several laboratories of the U. S. Agricultural Research Service and four technical centers of the Air Research and Development Command, U. S. Air Force, are also

participating in this program. In addition, research opportunities at the regular and senior postdoctoral levels are available at the Goddard Space Flight Center of the National Aeronautics and Space Administration, near Washington, D. C.; and at the Quartermaster Research and Engineering Center Laboratories, Natick, Mass., and at the Quartermaster Food and Container Institute, Chicago, Ill.

These resident research associateships have been established to afford young investigators of unusual promise an opportunity to receive advanced training in well-equipped laboratories under the guidance of highly qualified scientists dealing with various fields of fundamental and applied research.

Applicants will be required to produce evidence of training equivalent to that represented by the Ph.D. or Sc.D. degree and to demonstrate superior ability for creative research. Remuneration for most of these programs will be \$8955 a year subject to income tax.

Descriptive brochures and application forms may be obtained from the Fellowship Office of the Academy-Research Council. In order to be considered for 1961-62 awards, applications must be filed on or before February 1, 1961. Awards will be announced by the participating laboratories about April 1, 1961.

A new postdoctoral research fellowship program has been inaugurated this year with the support of the U. S. Air Force Office of Scientific Research. Awards will be made in the various branches of the natural and applied sciences to United States citizens for research at educational institutions and research laboratories in the United States and abroad. The stipend for these appointments is \$6,000 a year with dependency allowances.

Applications for this new program are also available from the Fellowship Office of the Academy-Research Council and must be filed no later than January 9, 1961.

OEEC SENIOR VISITING FELLOWSHIPS

The National Science Foundation has announced the 1961 senior visiting fellowship program sponsored by the Organization for

European Economic Cooperation (OEEC). This fellowship program is designed to assist scientific and technical institutions to incorporate more quickly into their own advanced teaching and research programs the most recent developments in their own and other countries. Each member or associated country of the OEEC administers the fellowship program for its own nationals.

The National Science Foundation is responsible for the administration of the program for citizens and nationals of the United States, including the selection of fellows. These fellowships permit *institutions* in the United States, its territories, and possessions, to send senior scientists on their staffs to study new techniques and developments at advanced research and educational institutions primarily in the OEEC member countries or in countries cooperating with that organization. Approximately 25 fellowships will be awarded to the selected applicants on April 17, 1961.

These fellowships are intended to provide advanced training in new specializations, as a means of strengthening the scientific work of institutions in particular fields, but they are not intended to support research as such, nor to help individuals pursue courses of academic study leading to higher degrees. The fellowships will be tenable normally for a minimum of eight weeks (including travel) up to six months. The program will cover most fields of science and technology, i.e., the mathematical, physical, biological, and engineering sciences. Awards will not be made for work in the social sciences or medicine.

It is expected that recipients of these awards will plan to study abroad in a country that belongs to or is cooperating with the OEEC. These countries are: Austria, Belgium, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom.

Additional information and application material may be obtained from the Fellowship Office of the Academy-Research Council. Applications must be received by the Office not later than January 6, 1961.

NATIONAL SCIENCE FOUNDATION FELLOWSHIPS

The National Academy of Sciences-National Research Council has again been called upon to assist the National Science Foundation in the selection of candidates for the Foundation's program of graduate and postdoctoral fellowships. The Foundation plans to award approximately 1,200 graduate and 150 postdoctoral fellowships in these two programs during the 1961-62 academic year.

These fellowships are open to citizens of the United States and applications are evaluated solely on the basis of ability. Fellowships may be applied to advanced study in the mathematical, physical, medical, biological, and engineering sciences, including anthropology, psychology (excluding clinical psychology), and the following social sciences: geography, mathematical economics, econometrics, demography, information and communication theory, experimental and quantitative sociology and the history and philosophy of science. They are open to college seniors, graduate and postdoctoral students, and others with equivalent training and experience.

Further information and application materials may be obtained from the Fellowship Office, Academy-Research Council.

STAFF APPOINTMENTS

The Office of Scientific Personnel has announced the appointment of **John A. Creager** as a research psychologist assigned to the fellowship program. Dr. Creager received his Ph.D. degree in psychology from Purdue University in 1952 and, before coming to the Academy-Research Council, was with the Laboratory of the Wright Air Development Division, Air Research and Development Command, U. S. Air Force, at the Lackland Base, San Antonio, Tex.

David R. Heebner and **Philip Mandel** have joined the staff of the Committee on Undersea Warfare to serve as professional consultants to a special Academy-Research Council panel. Mr. Heebner received his M.A. degree in electrical engineering from the University of Southern California in

1955 and is on a year's leave of absence from the Hughes Aircraft Company with which he has been affiliated since 1953. Professor Mandel received his B.S. degree in engineering (naval architecture) and mathematics from the University of Michigan in 1942 and is also on a year's leave of absence from the School of Naval Architecture and Marine Engineering, Massachusetts Institute of Technology.

Lee M. Hunt has joined the staff of the Committee on Undersea Warfare as a technical assistant to fill the vacancy left by the resignation of **John W. Cooper**, who is currently doing graduate work at Texas Agricultural and Mechanical College. Mr. Hunt has fulfilled the residency requirements for his M.A. degree in oceanography at Texas Agricultural and Mechanical College and previously served as a consultant with the U. S. Bureau of Mines and various private mining companies.

Edwin B. Coyl has been appointed a Professional Associate for the Medical Advisory Committees in the Division of Medical Sciences. Dr. Coyl graduated from the College of Medical Evangelists in 1931 and from then until his retirement as a Captain in the United States Navy served continuously as a medical officer with the Navy. During his years of service, he was in command of the hospital aboard the *U. S. S. Repose* during the Korean War; was Commanding Officer of the U. S. Naval Medical School, Bethesda, Md.; was in charge of the U. S. Naval Hospital at Newport, R. I.; and at the time of his retirement was Inspector General, Bureau of Medicine and Surgery, Navy Department.

The Materials Advisory Board has announced the appointment of **Capt. Arthur M. Blamphin**, U. S. Navy, ret., as Staff Engineer. Capt. Blamphin is a graduate of the University of Pennsylvania and holds a bachelor's degree in civil engineering (1928). As a staff member of the Board, he will serve as secretary of the Steering Committee for the Department of Defense Review Committees.

RECORD OF MEETINGS

September

- 1-2 Panel on Bio-Engineering of Protective Systems, *Woods Hole, Mass.*
- 6-9 Conference on the Biological Aspects of Metal Binding, *University Park, Pa.*
- 7 Federal Construction Council, Task Group on Piling
- 8 National Advisory Committee for the AASHO Road Test, *LaSalle, Ill.*
Special Advisory Committee on the U. S. Food and Drug Administration
- 9 Committee on Inter-American Scientific Cooperation
U. S. National Committee, International Astronomical Union
- 10 Ad hoc Committee on Science in Foreign Aid
- 11-13 Advisory Committee on Modular Coordination
- 12 Committee on Laboratory Animal Transportation, *Maywood, N. J.*
- 12-13 Committees on Atmospheric Sciences and Oceanography, Joint Air-Sea Interaction Panel
- 12-16 Subcommittee on Nuclear Constants, Conference on Atomic Masses, *Hamilton, Ontario*
- 13-14 Prevention of Deterioration Center, Committee on Soil Burial
- 14 Committee on Macromolecular Chemistry, *New York City*
Committee on Fire Research
- 15 Committee on Mathematics Advisory to the Office of Naval Research, *New York City*
Building Research Advisory Board, Executive Committee
Building Research Institute, Programs Committee
Federal Construction Council, Task Group on Expansion and Contraction Joint in Concrete
Masonry Construction
- 16 Planning Committee on Paints and Coatings
Planning Committee on Adhesives and Sealants
- 19-21 Workshop Conference on Formulating Highway Construction Programs
- 20 Working Group, International Indian Ocean Expedition
Conference on Measurement of Road Surface Deflections
- 21 Committee on Foods, Task Group on Freeze Drying of Foods, *Chicago*

September

- 21-23 Special Committee on Materials for AASHO Road Test
- 22 Committee on International Exchange of Persons, Washington Members
Cooperative Ultraviolet Light Study Group
- 22-25 Conference on Application of External Power to Prosthetics and Orthotics, *Lake Arrowhead, Calif.*
- 23 Special Advisory Committee on Soil Compaction Criteria for Existing and Proposed Fills
- 24 Screening Committees for National Science Foundation Postdoctoral Fellowships
- 25 Evaluation Board for National Science Foundation Postdoctoral Fellowships
- 26-27 Project Committee on Economics of Motor Vehicle Size and Weight
- 27 Committee on Ship Steel, *New York City*
- 27 Coordinating Committee on Oceanography
- 28 Ad hoc Group on Radio Astronomy
- 28-30 Committee on Nuclear Science, Subcommittee on Instruments and Techniques, *Asheville, N.C.*
- 29 Federal Construction Council, Task Group on Thermal Insulating and Waterproofing Materials for Hot and Refrigerated Piping
Subcommittee on Radiobiology
- 30 Committee on Sanitary Engineering and Environment, Subcommittee on Personnel and Training
Committee on Radiobiology

October

- 3 Institute of Laboratory Animals, Governing Board
- 4 Committee on Radiation Preservation of Food, *Chicago*
U. S. National Committee, International Documentation Federation
Working Group on Acceleration of Panel on Psychological and Physiological Testing
- 4-5 Working Group on Geology and Geophysics, International Indian Ocean Expedition
- 6 Building Research Institute, Research Committee
Division of Chemistry and Chemical Technology, Executive Committee

October

- 6-8 Committee on the Skeletal System, Seminar on Mechanisms of Formation of Organic Matrix with Particular Reference to the Skeletal System
Ninth Annual Clay Minerals Conference, *Lafayette, Ind.*
- 7 Subcommittee on Water Supply
Committee on Atmospheric Sciences, *Ann Arbor, Michigan*
MOHO Committee
- 8 Division of Earth Sciences, Executive Committee
Division of Biology and Agriculture, Executive Committee
- 9 National Academy of Sciences-National Research Council, Governing Board
- 10 Ad hoc Committee on International Relations in Biophysics
Committee on Pest Control-Wildlife Relationships, Subcommittee on Research
- 10-11 Armed Forces-National Research Council Committee on Bio-Astronautics, Panel on Information, *Williamsburg, Va.*
- 11 Committee on Ship Structural Design, *New York*
Screening Committee for Travel Grants to International Congress of Biophysics
Plastics Study Group
Committee on Pest Control-Wildlife Relationships, Subcommittee on Evaluation of Pesticide-Wildlife Loss Problems
- 12 Federal Construction Council, Task Group on Criteria for the Acceptance of Cast Iron Soil Pipe
Committee on Arctic Conference
- 13 Subcommittee on Toxicology
Organizing Committee for 16th International Congress of Zoology
- 13-14 Subcommittee on Neutron Measurements and Standards, *Los Alamos*
Committee on Pioneering Research, Conference on Heterocyclic Compounds and Alkaloids, *Natick, Mass.*
- 14 Subcommittee on Food Sanitation
Materials Advisory Board, Aerospace Manufacturing Techniques Panel
- 14-15 Food Protection Committee and Industry Committee, Joint Meeting
- 16 Agricultural Research Institute, Governing Board
- 17 Committee on Elastomers, *Natick, Mass.*

October

- 17 Ad hoc Committee for Formation of Committee on Primatology
Committee on Ship Steel, Project Advisory Committee SR-161, *Berkeley, Calif.*
- 17-18 Agricultural Research Institute
- 18 Committee on Ship Steel, Project Advisory
Committee SR-154, *Berkeley, Calif.*
- 18-19 Working Group in Physical and Chemical Oceanography, International Indian Ocean Expedition
Ad hoc Committee on Tuberculosis
Federal Construction Council, Task Group on
Criteria for the Acceptance of Cast Iron Soil Pipe
- 21 Subcommittee on Nuclear Reactors
Committee on Veterans Medical Problems, Executive Committee
Subcommittee on Waste Disposal
American Geophysical Union, Executive Committee
- 22 Committee on Oceanography, *New Haven, Conn.*
- 23-25 Special Committee on Public Dissemination of Research Findings
Ad hoc Panel on Engineering Research for Developing Countries
- 24 Working Group on Meteorology, International Indian Ocean Expedition
- 24-25 Building Research Advisory Board and Building Research Institute, Joint Policy Committee, *New York City*
U. S. National Committee, International Institute of Refrigeration
- 25 Committee on a National Atlas of the United States
Committee on Ship Steel, Project Advisory Committee SR-157, *Hoboken, N. J.*
- 26-27 Federal Housing Administration, Technical Studies Advisory Committee
- 27 Subcommittee on Symbols, Units and Nomenclature
Federal Construction Council, Task Group on Packaged Boilers
- 28 Committee on International Exchange of Persons
Committee on Seismological Stations
- 28-31 Committee on Human Environments in Central Africa, *Tucson, Ariz.*
- 29 Committee on Cardiovascular System
- 31 Subcommittee on Radiochemistry
Committee on Economics of Motor Vehicle Size and Weight

NEW PUBLICATIONS

- American Geological Institute. *Survey of Geology-Geophysics Students in the Colleges and Universities of the United States and Canada in 1959-60*. Washington, 1960. (AGI Report 12, 1960 Edition.) 13 p.
- American Geological Institute. Glossary Review Committee. *Supplement to the Glossary of Geology and Related Sciences*. Washington, 1960. 72 p. \$2.50. (Available from: American Geological Institute, 2101 Constitution Ave., Washington 25, D. C.)
- Beals, Alan R., et al. *Field Guide to India [by] Alan R. Beals and John T. Hitchcock, with a Section on Pakistan [by] Mary Jean Kennedy*. Washington, 1960. (NAS-NRC Publication 704. Division of Anthropology and Psychology, Committee on International Anthropology, Field Guide Series No. 4.) 61 p. \$1.25.
- Bernier, Joseph L. *Tumors of the Odontogenic Apparatus and Jaws*. Washington, Armed Forces Institute of Pathology, 1960. (Atlas of Tumor Pathology, Sect. IV, Fasc. 10a.) 107 p., illus. \$1.00. (Available from: Armed Forces Institute of Pathology, Washington 25, D. C.)
- Burton, Milton, et al., eds. *Comparative Effects of Radiation. Report of a Conference Held in San Juan at the University of Puerto Rico, February 15-19, 1960, sponsored by National Academy of Sciences-National Research Council*. New York, John Wiley & Sons, 1960. 426 p., illus. \$8.50. (Available from: John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y.)
- Conference on Transportation Research. *Report of a Study Group Convened by the National Academy of Sciences at Woods Hole, Massachusetts, August 1960 . . .* Washington, 1960. (NAS-NRC Publication 840.) 88 p. \$1.00.
- Conference on Tropical Botany, Fairchild Tropical Garden, May 5-7, 1960. Washington, 1960. (NAS-NRC Publication 822.) 16 p.
- Digest of Literature on Dielectrics, Volume 23, 1959. Washington, NAS-NRC, Committee on Digest of Literature, Conference on Electrical Insulation, 1960. (NAS-NRC Publication 799.) 421 p. \$8.00.
- Lawson, Chester A., ed. *Laboratory and Field Studies in Biology, a Sourcebook for Secondary Schools. Sponsored by the National Academy of Sciences-National Research Council*. New York, Holt, Rinehart and Winston, 1960. 2 volumes: student's volume, \$1.80; teacher's volume, \$3.20; 25% discount to schools. (Available from: Holt, Rinehart & Winston, 383 Madison Ave., New York 17, N. Y.)
- Lumby, J. R., comp. *Atlas of Track Charts of IGY Cruises Part I: North Atlantic*. College Station, Tex., 1960. (National Academy of Sciences, World Data Center A: Oceanography. IGY Oceanography Report No. 1.) 46 p. (Available from: IGY World Data Center A: Oceanography, Department of Oceanography and Meteorology, Agricultural and Mechanical College of Texas, College Station, Tex.)
- Mussen, Paul H., ed. *Handbook of Research Methods in Child Development*. New York, John Wiley & Sons, 1960. 1061 p., illus. \$15.50. (Sponsored by NAS-NRC, Committee on Child Development. Available from: John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y.)
- National Academy of Sciences. *Die biologischen Wirkungen ionisierender Strahlen, eine Studie der National Academy of Sciences, Washington, 1956*. Frankfurt am Main, Bundesminister für Atomfragen und Verband der Ärzte Deutschlands (Hartmannbund), 1957. (Schriftenreihe des Bundesministers für Atomfragen Strahlenschutz, Heft 2.) 93 p. 4 DM. (Available from: Verband der Ärzte Deutschlands (Hartmannbund), 68 Niedenau, Frankfurt am Main, Germany.)
- National Research Council. Agricultural Research Institute. *Research Outlook on Soil, Water, and Plant Nutrients. Proceedings of the Eighth Annual Meeting of the Agricultural Research Institute, October 12-13, 1959, Washington, D. C.* Washington, 1960. (NAS-NRC Publication 785.) 103 p., illus.
- National Research Council. Building Research Advisory Board. *Residential Building Sewers*. Washington, 1960. (NAS-NRC Publication 787. Building Research Advisory Board, Report No. 16 to the Federal Housing Administration.) 126 p. \$2.00.
- National Research Council. Building Research Advisory Board. *Small-Size Pipe for Sanitary Lateral Sewers*. Washington, 1960. (NAS-NRC Publication 507. Building Research Advisory Board, Report No. 10 to the Federal Housing Administration, May 1957, Revised September 1960.) 48 p. \$1.50.
- National Research Council. Building Research Institute. *Cleaning and Purification of Air in Buildings*. Washington, 1960. (NAS-NRC Publication 797.) 61 p. \$4.00.
- National Research Council. Building Research Institute. *Insulated Masonry Cavity Walls; a Research Correlation Conference . . .* Washington, 1960. (NAS-NRC Publication 793.) 82 p. \$4.00.

National Research Council. Building Research Institute. *Paints and Coatings: Field Surface Preparation, Field Application Methods, Water Thinned Materials. A Research Correlation Conference . . .* Washington, 1960. (NAS-NRC Publication 796.) 72 p., illus. \$5.00.

National Research Council. Building Research Institute. *Sandwich Panel Design Criteria. A Research Correlation Conference . . .* Washington, 1960. (NAS-NRC Publication 798.) 209 p., illus. \$8.00.

National Research Council. Division of Chemistry and Chemical Technology. *Roster . . . Membership of the Division and Its Centers, Officers and Committees, 1960-1961.* Washington, NAS-NRC, 1960. 23 p.

National Research Council. Division of Engineering and Industrial Research. *Annual Report for the Year Ending June 30, 1960.* Washington, NAS-NRC, 1960. 149 p.

National Research Council. Highway Research Board. *Economic Analysis in Highway Programming, Location and Design: Workshop Conference Proceedings, September 17-18, 1959.* Washington, 1960. (NAS-NRC Publication 775. Highway Research Board Special Report 56.) 187 p. \$4.00.

National Research Council. Highway Research Board. *Soil Compaction and Proof-Rolling of Subgrades.* Washington, 1960. (NAS-NRC Publication 763. Highway Research Board Bulletin 254.) 35 p. \$1.00.

National Research Council. Highway Research Board. *Traffic Origin-and-Destination Studies; Appraisal of Methods.* Washington, 1960. (NAS-NRC Publication 762. Highway Research Board Bulletin 253.) 188 p. \$3.80.

National Research Council. Maritime Cargo Transportation Conference. *Unitization in Maritime Transportation, an Annotated Bibliography.* Washington, 1960. (NAS-NRC Publication 795.) 43 p. \$1.00.

National Research Council. Subcommittee on Poultry Nutrition. *Nutrient Requirements of Poultry, Revised 1960, a Report of the Committee on Animal Nutrition, Agricultural Board.* Washington, 1960. (NAS-NRC Publication 827. Nutrient Requirements of Domestic Animals, No. 1.) 28 p. \$1.00.

National Research Council. Subcommittee on Radiochemistry. *Source Material for Radiochemistry, July 1960.* Washington, 1960. (NAS-NRC Publication 825. Committee on Nuclear Science, Nuclear Science Series, Report No. 27, Rev. 1.) 39 p.

Seitner, Philip G., ed. *Biology Code of the Chemical-Biological Coordination Center.* Washington, 1960. (NAS-NRC Publication 790.) 222 p., \$7.00; \$12.00 for set of this volume and the one following.

Seitner, Philip G., ed. *Key to the Biology Code of the Chemical-Biological Coordination Center* Washington, 1960. (NAS-NRC Publication 790K.) 210 p., \$7.00; \$12.00 for set of this volume and the one above.

Symposium on Human Problems in the Utilization of Fallout Shelters, Held at the National Academy of Sciences, Washington, D. C. 11 and 12 February, 1960. Editors, George W. Baker [and] John H. Rohrer . . . Washington, 1960. (NAS-NRC Publication 800. Disaster Research Group, Disaster Study No. 12.) 234 p. \$3.00.

Notice of Academy Meetings

NATIONAL ACADEMY OF SCIENCES

Annual Meeting, Washington, D. C., April 24-26, 1961

NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL

Governing Board, Washington, D. C., December 11, 1960

Governing Board, Washington, D. C., February 12, 1961

Governing Board, Washington, D. C., April 23, 1961

Governing Board, Washington, D. C., June 11, 1961

NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL

President
DETLEV W. BRONK

Vice President
FARRINGTON DANIELS

Home Secretary
HUGH L. DRYDEN

Treasurer
LLOYD V. BERKNER

Foreign Secretary
H. P. ROBERTSON

COUNCIL OF THE ACADEMY

ROGER ADAMS
LLOYD V. BERKNER
DETLEV W. BRONK
FARRINGTON DANIELS

HUGH L. DRYDEN
THOMAS FRANCIS, JR.
W. V. HOUSTON
G. EVELYN HUTCHINSON

SAUNDERS MAC LANE
H. P. ROBERTSON
ROBLEY C. WILLIAMS

Executive Officer
S. DOUGLAS CORNELL

Business Manager
G. DONALD MEID

DIVISIONS OF THE RESEARCH COUNCIL

Anthropology and Psychology:
EMIL W. HAURY, *Chairman*
GLEN FINCH, *Executive Secretary*

Engineering and Industrial Research:
AUGUSTUS B. KINZEL, *Chairman*
LOUIS JORDAN, *Executive Secretary*

Biology and Agriculture:
H. BURR STEINBACH, *Chairman*
FRANK L. CAMPBELL, *Executive Secretary*

Mathematics:
J. B. ROSSER, *Chairman*
HAROLD W. KUHN, *Executive Secretary*

Chemistry and Chemical Technology:
ROBERT C. ELDERFIELD, *Chairman*
CLEM O. MILLER, *Executive Secretary*

Medical Sciences:
R. KEITH CANNAN, *Chairman*

Earth Sciences:
EDWARD B. ESPENSHADE, JR., *Chairman*
LINN HOOVER, *Executive Secretary*

Physical Sciences:
BRIAN O'BRIEN, *Chairman*
JOHN S. COLEMAN, *Executive Secretary*

Office of International Relations:
WALLACE W. ATWOOD, JR., *Director*

Office of Scientific Personnel:
M. H. TRYTTEN, *Director*

*The search for Truth is in one way hard
and in another easy. For it is evident that no one
can master it fully nor miss it wholly. But each adds
a little to our knowledge of Nature, and from all
the facts assembled there arises a certain grandeur.*

—ARISTOTLE

